SRC

SARCOS RESEARCH CORPORATION
261 EAST 300 SOUTH, SUITE 150
SALT LAKE CITY, UTAH 84111
TELEPHONE: (801) 531-0559
FAX: (801) 531-0315

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Scientific Officer
Office of Naval Research
Attn: Dr. Richard Brandt
Ref: Contract N00014-91-C-0071
800 North Quincy Street
Arlington, Virginia 22217-5000

Re: Progress Report No. 2 for Navy SBIR on
"STM-based Hydrophone Sensors"

Report

The following progress report covers the period of 15 May 1991 through 1 July 1991. The following activities are reported:

- Numerous meetings have taken place with the two experts whom we have signed on as consultants -- one in the area of hydrophones, the other in the area of STMs.
- Preliminary hydrophone transducer packages have been designed, incorporating tunneling transducer elements. Single-chip, integrated (sensor plus power electronics plus multiplexing) designs are presently under consideration.
- Additional calculations of membrane deflections and frequency responses versus membrane dimensions, consistent with tunneling sensitivities, have been made.
- Analytical comparisons have been made between STM devices and capacitive-based systems, PZLT-based systems, and interferometric-based systems, for SNRs and sensitivity.
- Estimates of power consumption of servo-controlled STM-based hydrophones are being made, and compared to existing hydrophones.
- Estimates of the self-noise generated by a servo-controlled STM-based hydrophone are being made.

- **Electronic interfaces and power requirements are being defined.**

- **Pert charts have been updated.**

Sincerely,

Fraser Smith, P.I.